THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES

VOLUME I FIELD OPERATIONS (FO)
VOLUME II GROUNDWATER (GW)
VOLUME III GEOTECHNICAL (GT)
VOLUME IV SURFACE WATER (SW)
VOLUME V ECOLOGY (EE)
VOLUME VI AIR (AP)

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FO 01	Air Monitoring and Dust Control	2	05/12/92
FO 02	94-DMR--000563 - Cancellation of FO 02 Transmittal of QA Records	3	04/15/94
FO 03	General Equipment Decontamination	2	05/12/92
94-DMR-001021	Section FO 03 Text Addition	2	05/26/94
94-DMR-001010	LIMITED SCOPE - Section FO 03 Text Modification	2	06/01/94
94-DMR-001224	Equipment Decontamination Location Adjustment	2	07/15/94
FO 04	Heavy Equipment Decontamination	2	05/12/92
94-DMR-001009	LIMITED SCOPE - Section FO 04 Text Modification	2	06/01/94
FO 05	Handling of Purge and Development Water	2	05/12/92
94-DMR-000278	Groundwater Monitoring Modifications	2	02/25/94
FO 06	Handling of Personal Protective Equipment	2	05/12/92
FO 07	Handling of Decontamination Water and Wash Water	2	05/12/92
94-DMR-001175	LIMITED SCOPE - Decontamination Water Disposal Location Changes	2	06/20/94
FO 08	Handling of Drilling Fluids and Cuttings	2	05/12/92
94-DMR-001650	Procedural Clarifications	2	09/27/94

Procedure No.	Title	Rev No.	Effective Date
FO 09	Handling of Residual Samples	2	05/12/92
FO 10	Receiving, Labeling, and Handling Environmental Materials Containers	2	05/12/92
93-DMR-000677	DMR	2	11/01/93
94-DMR-000244	Drying Agent Modification	2	03/14/94
94-DMR-000558	Form Modification	2	04/15/94
94-DMR-001649	Deletion of Text Addressed in FO 08	2	09/27/94
FO 11	Field Communications	2	05/12/92
FO 12	Decontamination Facility Operations	2	05/12/92
FO 13	Containerization, Preserving, Handling and Shipping of Soil and Water Samples	2	05/12/92
93-DMR-000530	Section FO 13 Modification	2	11/04/93
93-DMR-000667	Section FO 13 Modification	2	11/20/93
94-DMR-000143	Composite Sampling Clarification	2	02/11/94
94-DMR-001670	New Statement of Work	2	09/15/94
FO 14	4-B29-ER-OPS-FO 14 - Field Data Management	3	09/09/94
FO 15	Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)	2	05/12/92
FO 16	Field Radiological Measurements	2	05/12/92
FO 18	Environmental Sample Radioactivity Content Screening	1	05/12/92
FO 19	Base Laboratory Work	2	05/12/92
FO 23	4-F99-OPS-FO 23 - Management of Soil and Sediment Investigative Derived Materials (IDM)	0	01/11/94
94-DMR-000137	Training Requirements Clarification	0	01/28/94
94-DMR-000148	Section FO 23 Modifications	0	02/09/94
94-DMR-001108	Buried Instrumentation and Existing Soil	0	06/14/94
94-DMR-001350	Various Text Additions and Deletions Regarding Drums and Use of SOP FO 29	0	08/16/94

Procedure No.	Title	Rev No.	Effective Date
FO 25	4-B11-ER-OPS-FO 25 - Shipment of Radioactive Materials Samples	0	12/01/93
FO 27	4-BO1-ER-OPS-FO 27 - Collection of Floor/Equipment Hot Water Rinsate Samples	0	07/26/93
FO 29	4-H46-ENV-OPS-FO 29 - Disposition of Soil and Sediment Investigation-Derived Materials	0	06/24/94
94-DMR-001226	Allowance of Procedural Use for Waste Piles	0	07/15/94
94-DMR-001741	Permission of Use of Computer-Generated Forms and Other Minor Corrections	0	10/07/94
FO 30	4-I11-ER-OPS-FO 30 - Environmental Restoration Program Division Equipment Operation	0	10/07/94
FO 31	4-I49-ENV-OPS-FO 31 - Groundwater Recovery/Storage System - Normal Operations OU1, Bldg 891	0	11/23/94
FO 32	4-I50-ENV-OPS-FO 32 - Treated Effluent Discharge OU1, Bldg 891	0	04/13/94
FO 34	4-I52-ENV-OPS-FO 34 - Ion Exchange System - Normal Operations OU1, Bldg 891	0	11/23/94
FO 35	4-I53-ENV-OPS-FO 35 - Ultraviolet/Hydrogen Peroxide Oxidation System - Normal Operations OU1, Bldg 891	0	11/15/94
FO 37	4-I55-ENV-OPS-FO 37 - Neutralization Tank - Normal Operations OU1, Bldg 891	0	11/23/94
FO 38	4-I56-ENV-OPS-FO 38 - Bulk Chemical Handling, Transfer, and Storage, OU1, Bldg 891	0	12/02/94
FO 39	4-I57-ENV-OPS-FO 39 - Calibration, Operation, and Maintenance of Monitoring and Fluid Handling Equipment OU1, Bldg 891	0	12/02/94
•FO 43	4-I61-ENV-OPS-FO 43 - Filter Press Operation and Cleaning OU2, Field Treatability Unit	0	12/16/94

Rocky Flats Environmental Technology Site

4-I61-ENV-OPS-FO.43

REVISION 0

FILTER PRESS OPERATION AND CLEANING OPERABLE UNIT 2, FIELD TREATABILITY UNIT

APPROVED BY _____ / S G Stiger / 11-23-94

Director, EG&G Environmental Restoration Program Division — Print Name — Date

_____ for / M C Brooks / 11-22-94

Quality Assurance Program Manager, Data Management and Reporting Services — Print Name — Date

DOE RFFO/ER Concurrence on file ☑ Yes ☐ No ☐ NA

Environmental Protection Agency Approval Received ☐ Yes ☑ No ☐ NA

Responsible Organization Environmental Restoration Program Division Effective Date 12-16-94 dlw

CONCURRENCE BY THE FOLLOWING DISCIPLINES WILL BE DOCUMENTED IN THE PROCEDURE HISTORY FILE

Data Management and Reporting Services
Environmental Operations Management
Waste Management
Industrial Hygiene
Occupational Safety
Operable Unit 2 Closure
Radiological Health and Engineering
Surface Water Division

USE CATEGORY 3

ORC review not required

The following have been incorporated in this revision
94-DMR-000191

Periodic review frequency 1 year from the effective date

LIST OF EFFECTIVE PAGES

Pages	Effective Date	Change Number
1-20	/ /94	

TOTAL NUMBER OF PAGES 20

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1 PURPOSE

This procedure describes the administrative and operations steps used at the Rocky Flats Environmental Technology Site for operating or cleaning the JWI filter press located in trailer T900B at the Operable Unit 2 Field Treatability Unit (FTU) The operating instructions include detailed descriptions and instructions for safe operations when filling, emptying, and cleaning the filter press

2 SCOPE

This procedure applies to Environmental Restoration Program Division (ERPD) Operations Support and subcontractor personnel

This procedure addresses the following topics

- Filling the Filter Press
- Filling waste drums
- Using the Pressure Washer
- Cleaning the Filter Press

3 OVERVIEW

The FTU solids dewatering system is used to reduce the amount of liquid in the solids contained in the Sludge Holding Tank TK-12 prior to packaging for storage and disposal The system includes an air operated slurry pump to transfer concentrated solids from TK-12 to the JWI filter press The JWI filter press removes water from the solids and creates a filter cake that is 35 to 50% solids by weight The filtrate produced by the filter press is recycled to the Concentration Tank TK-8 The filter cake is transferred into drums placed beneath the elevated filter press

4 RESPONSIBILITIES

4 1 Operator

Operates and monitors FTU system equipment

Reports abnormal conditions, occurrences, and incidents to Shift Foreman

Complies with all Precautions and Limitations of the Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan (HASP)

Ensures visitors comply with the HASP

Completes required logs and forms

4.2 Responsible Manager

Ensures that all personnel, including subcontractors, are trained and qualified to perform the duties, task, and responsibilities described in this procedure

Ensures that all core and ERPD-specific training has been completed and documented, and that copies of all documentation have been forwarded to the ERPD training files

4.3 Shift Foreman

Responds to and reports all spills in accordance with Hazardous Waste Requirements Manual, Section 4 0, 1-C49-8WRM-04, Release, Response, and Reporting

5 LIMITATIONS AND PRECAUTIONS

5 1 Pressure Washer

- Proper personal protective equipment (PPE) shall be used at all times including face shield and leather gloves
- Leaving the shutoff gun in OFF for more than 3 min may overheat the pump and cause pump failure
- The wand shall be gripped firmly when starting the pressure washer Failure to do so could result in injury to the Operator from a whipping wash wand
- Placing hands or fingers in front of the wash wand or pointing the gun at your body or at anyone else could result in severe personal injury
- Operating the unit with high pressure leaks can cause serious bodily harm
- The washer shall be run on a level surface, and moisture shall be prevented from reaching the power unit or electrical controls

5 2 JWI Filter Press

- Before they operate the JWI filter press, personnel shall be aware of pinch points
- The air supply switch shall be placed in OFF when the filter press is full and is NOT going to be emptied immediately
- The air supply switch shall be placed in OFF when the filter press is open during cleaning

5.2 JWI Filter Press (continued)

- Proper personal protective equipment (PPE) shall be used at all times when emptying or cleaning the JWI filter press PPE requirements are contained in the HASP

- Radiological monitoring equipment shall be used in accordance with the HASP when emptying the filter press

6 PREREQUISITES

6 1 Field Preparation

6 1 1 Preparation To Fill JWI Filter Press

Operator

[1] Ensure that air pressure to the sludge pump CSP-2 is 0 psi

[2] Ensure that TK-12 is three-fourths or greater full of solids, in order to process two drums of waste

6 1 2 Preparation to Fill Waste Drums

Project manager

[1] Complete the required documentation including Waste Traveler Forms and sampling forms in accordance with 4-C77-WO-1101, Solid Radioactive Waste Packaging Outside the Protected Area

Operator

[1] Obtain and place white drums and liners in T900B

[2] Prepare white drums and liners in accordance with 4-C77-WO-1101

6 1 3 Preparation To Use Pressure Washer

Operator

CAUTION

Water must be supplied before starting the pressure washer motor or pump damage will result

[1] Verify that the water supply to the pressure washer is on and supplying a minimum of 2 gpm at a pressure of 30 to 100 psi

6 1 3 Preparation To Use Pressure Washer (continued)

Operator (continued)

[2] Connect the electrical cord and test the ground fault circuit interrupter (GFCI) contained within the pressure washer plug using the reset test procedures located on the GFCI device Do not use the machine if the GFCI device fails the test

6 1 4 Preparation To Clean JWI Filter Press

Operator

[1] Verify that the press is empty before opening it to clean the filter plates

7 INSTRUCTIONS

7 1 Filling JWI Filter Press

Operator

[1] Place the air supply switch in ON

[2] Place the selector switch in CLOSE

[3] After the press is fully closed, place the hydraulic pump control switch in ON

[4] Close V-97

[5] Open the following valves
- V-88
- V-89
- V-90
- V-91

[6] Open the air supply valve V-43 to the Wilden Sludge Pump SP-2

[7] Fill the press as follows

[A] Initially set the pressure to the pump at 20 psi and increase in increments of 20 psi until the maximum pressure of 100 psi is reached As the filter press fills, the time between strokes of the pump will increase

[B] Increase the pressure to the pump 20 psi when the time between pump strokes reaches approximately 1 min

When the pressure is 100 psi and the time between pump strokes is greater than two min, the press is full Filling the JWI filter press should take a minimum of 30 min, and normally will take 1 to 2 hours

[8] When the press is full, close the air supply V-43 to SP-2, and bleed the pressure from the air supply regulator

[9] **IF** performing an air blowdown of the filter press,
THEN

[A] Close the following valves
- V-88
- V-89
- V-90
- V-91

7 1 Filling JWI Filter Press (continued)

Operator (continued)

[B] Open V- 97 and regulate the pressure to 40 psi

[C] Slowly open V- 90 to allow air to bypass the filter press, and flush the water standing in the return pipe to TK-8

[D] Close V-90

[E] Allow the filter press to blow down for 2 to 3 min

[F] Close V-97

[G] Open the following valves
- V-88
- V-90
- V-91

[H] Allow a minimum of 2 min for the filter press to gravity drain

[I] Close the following valves
- V-88
- V-90
- V-91

[10] Record all activities in the OU2 Operations Log Book

7.2 Filling Waste Drums

Operator

[1] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP

[2] Prepare the drum to be filled by placing two plastic round bottom liners into the drum

[3] Use a drum cart to place the drum under the barrel fill guide under the filter press

[4] Open the press by placing the hydraulic switch in OFF, and the selector switch in OPEN

[5] **WHEN** the hydraulic ram has retracted completely,
THEN place the air supply switch in OFF to prevent the press from being closed during drum filling

[6] Separate the filter plates one at a time and direct the cake into the barrel fill guide and into the drum

7.2 Filling Waste Drums (continued)

Operator (continued)

CAUTION

Tearing or damaging the filter cloth will render the cloth unusable and result in replacement

[7] Use a nylon spatula to dislodge any solids that stick to the plates

[8] Break up the solids with a nylon spatula as they are put into the drum to eliminate void space, and get a full press of solids into one drum

[9] **WHEN** the solids from four plates have been placed into the drum,
THEN sample the sludge in accordance with SAP-RFP/ER-WP-OU2 4, Operable Unit 2 Field Treatability Unit Sample and Analysis Plan

[10] Evenly spread 1/2 to 3/4 cup of Radsorb over the sludge

[11] Repeat steps [6] through [10], as necessary, to fill the drum

[11] **WHEN** the drum is full of sludge,
THEN evenly spread 1/2 to 3/4 cup of Radsorb over the sludge

[12] Close the drum in accordance with 5-23000-WRP -WO-1101, Solid Radioactive Waste Packaging Outside the PA

[13] Wipe down the press using a bucket of clean water and a sponge, paying attention to the gasketed areas on the plates

[14] Empty the cleaning bucket into TK-12

[15] Close the press for refilling or cleaning

[16] Immediately clean all loose sludge from the work area using a bucket of clean water and a sponge, to prevent the possibility of dried material becoming airborne

[17] Empty the cleaning bucket into TK-12

[18] Rinse the cleaning bucket and sponge with clean water, and empty the cleaning bucket into TK-12

[17] Contact the Health and Safety Specialist to conduct a radiological survey of the area, in accordance with the HASP

7.2 Filling Waste Drums (continued)

Operator (continued)

[18] Record all activities in the OU2 Operations Log Book

7.3 Using The Pressure Washer

Operator

[1] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP including a face shield and leather gloves

[2] Place the pump control switch in ON

[3] Grasp the trigger gun firmly and open the trigger on the wash wand

[4] Sweep the area to be washed with even, overlapping strokes

[5] **WHEN** cleaning is complete,
THEN release the trigger on the wash wand

[6] Place the pump control switch in OFF

[7] **IF** the pressure washer is not to be used within 6 weeks,
THEN flush the system with antifreeze for rust protection

[8] Record all activities in the OU2 Operations Log Book

7.4 Cleaning the Filter Press with Pressure Washer

Operator

[1] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP including a face shield and leather gloves

[2] Place the air supply switch on the filter press in ON

[3] Place the selector switch on the filter press in OPEN

[4] **WHEN** the hydraulic ram has retracted completely,
THEN place the air supply switch on the filter press in OFF to prevent the press from being inadvertently closed during cleaning

[5] Remove the barrel fill guide

[6] Remove and stack the filter plates

7 4 Cleaning the Filter Press with Pressure Washer (continued)

Operator (continued)

[7] Scrub with a bristle brush and rinse
- The fixed filter plate
- Exterior surfaces of the press
- Trailer walls and the floor

[8] Use a shop vacuum to pick up the wash or rinse water to prevent it from flowing to the east end of the trailer

[9] Place the filter plates in the trough one at a time, and clean using Section 7 3 Steps [1] through [6], paying attention not to damage the gasketed areas

[10] Wipe down each plate, paying attention to the gasketed areas

[11] Place the cleaned plates back in the press, alternating the dot pattern 1,3,1, etc until all the plates are reinserted into the press

[12] Place the air supply switch in ON

[13] Close the filter press by placing the selector switch in CLOSE

[14] Place the air supply switch in OFF

[15] Place the barrel fill guide in the trough, and scrub and rinse

[16] Replace the barrel fill guide under the filter press

[17] Procure the electric drum pump from T900B

[18] Use the electric drum pump to empty the cleaning water from the trough into TK-12

[A] Place electric drum pump in trough

[B] Verify that the drum pump control switch is in OFF

[C] Plug the drum pump power cord into a 120V receptacle

[D] Attach a 1 in polyethylene (poly) hose to the discharge of the drum pump

[E] Run the poly hose from the drum pump into TK-12

7 4 Cleaning the Filter Press with Pressure Washer (continued)

Operator (continued)

[F] Place the drum pump control switch in ON and pump the contents from the trough into TK-12

[G] **WHEN** the trough is empty,
THEN place the drum pump control switch in OFF

[19] Fill a 5-gal plastic container with water for flushing the drum pump

[A] Open V-99

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND, and observe that the control switch illuminates

The illuminated control switch lamp is an indication that the pump is RUNNING

[C] Open V-39

[D] Open the hose spigot at the outlet of V-39 and fill container

[E] **WHEN** the container is full,
THEN

[a] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch to OFF

[b] Close V-39 and hose spigot

[c] Close V-99

[20] Rinse the electric drum pump

[A] Place drum pump into the 5-gal rinse water container

[B] Run the poly hose from the drum pump into TK-12

[C] Rinse the exterior of the drum pump suction tube

[D] Place the drum pump control switch in ON and pump rinse water from the 5-gal container into TK-12

[E] **WHEN** the 5-gal container is empty,
THEN place the control switch for the drum pump in OFF

7 4 Cleaning the Filter Press with Pressure Washer (continued)

Operator (continued)

[F] Drain the transfer hose into TK-12

[G] Empty the rinse water remaining in the 5-gal container into TK-12

[21] Store the electric drum pump in T900B

[22] Rinse the trough with clean water

[23] Vacuum out the trough using the shop vacuum

[24] Scrub the floor, and pick up the water with the shop vacuum

[25] Empty the water from the shop vacuum into a bucket, and empty the bucket into TK-12

[26] Mop the floor, using a mop and a mop bucket filled with clean water

[27] Empty the water from the mop bucket into TK-12

[28] Contact the Health and Safety Specialist to conduct a radiological survey of the area, in accordance with the HASP

[29] Record all activities in the OU2 Operations Log Book

8 RECORDS

Management of all records is consistent with 1-77000-RM-001, Records Management Guidance for Records Sources

Project Manager

[1] Ensure that the original and one copy of the following quality-related records, as appropriate, are transmitted to the ERPD Project File Center in accordance with 2-G18-ER-ADM-17 01, Records Capture and Transmittal

- Waste Traveler Form(s)
- Sampling Form(s)
- OU 2 Operations Log Book
- Qualification/Training Documentation, as required
- Occurrence Reports, as required

Submission of record copies to the ERPD Project File Center satisfies Administrative Record requirements in accordance with 3-21000-ADM-17 02, Administrative Records Screening and Processing

8 RECORDS (continued)

There are no nonquality records generated by this procedure

9 REFERENCES

Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan

SAP-RFP/ER-WP-OU2 4, Operable Unit 2 Field Treatability Unit Sample and Analysis Plan

1-C49-8WRM-04, Release, Response, and Reporting

1-77000-RM-001, Records Management Guidance for Records Sources

2-G18-ER-ADM-17 01, Records Capture and Transmittal

3-21000-ADM-17 02, Administrative Records Screening and Processing

4-C77-WO-1101, Solid Radioactive Waste Packaging Outside the Protected Area

APPENDIX 1
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OPERABLE UNIT 2 SYSTEM VALVES

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-1	6 in BFLY*	M	Suction of PP-8-1	Feed to PP-8-1
V-2	6 in BFLY*	M	Discharge of PP-8-1	Feed to Top Train
V-3	6 in BFLY*	M	Discharge of PP-8-1	Feed to Middle Train
V-4	6 in BFLY*	M	Discharge of PP-8-1	Feed to Bottom Train
V-5	6 in BFLY*	M	Module Train Discharge	Discharge from Top Train
V-6	6 in BFLY*	M	Module Train Discharge	Discharge from Middle Train
V-7	6 in BFLY*	M	Module Train Discharge	Discharge from Bottom Train
AV-8	2 in BALL	A	Bottom Train Discharge	Cleaning Inlet
AV-9	2 in BALL	A	Top Train Inlet	Cleaning Outlet
V-10	2 in BALL	M	Cleaning Pump CP-1	Cleaning Pump Discharge
AV-11	2 in BALL	A	Cleaning Pump Discharge	Cleaning Return to TK1 and 2
AV-12	2 in BALL	A	TK-9	CP-1 Pump Suction
AV-13	2 in BALL	A	TK-10	CP-1 Pump Suction
AV-14	2 in BALL	A	TK-9	TK-10 Fill Inlet
AV-15	2 in BALL	A	TK-9	TK-9 Cleaning Return
AV-16	2 in BALL	A	TK-9	TK-9 Filtrate Return
AV-17	2 in BALL	A	TK-10	TK-10 Cleaning Return
AV-18	2 in BALL	A	TK-10	TK-10 Filtrate Return
AV-19	3 in BFLY	A	Filtrate to Neutralization	Filtrate Open/Close
V-20	2 in BALL	M	TK-9 and TK-10	TK-9 and TK-10 Drain
V-22	2 in BALL	M	TK-8 Drain	TK-8 Drain
V-23	2 in BALL	M	Sludge Pump	Sludge Pump Suction
V-24	2 in BALL	M	TK-11	TK-11 Drain
V-25	2 in BALL	M	TP-11-1 Inlet	TP-11-1 Suction
V-29	2 in BALL	M	TP-11-1	Flow Control to GAC
AV-30	2 in BALL	A	Top Train Inlet	Cleaning Return to TK-8
V-31	2 in BALL	M	TP-11-2	TP-11-2 Feed

* = Butterfly

APPENDIX 1
Page 2 of 5

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-33	2 in BALL	M	TK-9	Chemical Fill
V-34	2 in BALL	A	TK-10	Chemical Fill
AV-35	2 in BALL	M	Filtrate above PP-8-1	Filtrate Return to TK-8
V-37	1/2 in BALL	M	Seal Water Filter	Seal Water Filter Isolation
V-38	2 in BALL	M	TP-11-1	Trailer No 1 Water Supply
V-39	2 in BALL	M	TP-11-1	Trailer Hose Down
V-40	2 in BFLY*	M	Bottom Train No 1	Train No 2 Isolation
V-41	2 in BFLY*	M	Middle Train No 2	Train No 3 Isolation
V-55	2 in BALL	M	Effluent from TK-6	Drain
V-57	2 in BALL	M	Effluent from TK-5	Drain
V-58	1 in BALL	M	Effluent from TK-5	Influent to Acid Metering Pump
V-59	1 in BALL	M	Influent to TK-4	TK-4 Fill Water
V-61	1 in BALL	M	Top of TK-6	Lime Tank Water Fill
V-64	1/2 in BALL	M	Top of TK-1	Acid Delivery
V-65	11/2 in BALL	M	Top of TK-2	Lime Delivery
V-66	2 in BALL	M	Bottom, Left Side, TK-1	Drain
V-67	2 in BALL	M	Bottom, Right Side, TK-2	Drain
AV-80	11/2 in BALL	A	Effluent from TK-11	Filtrate Discharge Flow Control
V-81	1/2 in BALL	M	Influent to TK-2	Sulfuric Acid Injection
V-82	1 in BALL	M	Effluent from Seal Water Pump	Distribute Seal Water
V-83	3 in BALL	M	West End of T900A System	Drain for T900A
V-84	1 in BALL	M	Top of TK-5	Influent Water to TK-5
V-85	1 in BALL	M	Influent Water to Lime Pump	Lime Line Flush
V-86	1 in BALL	M	Effluent from TK-6	Lime Pump Suction Isolation
V-87	1 in BALL	M	Effluent from Lime Pump	Lime Pump Discharge Isolation

* = Butterfly

APPENDIX 1
Page 3 of 5

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-90	11/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-91	11/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-92	2 in BALL	M	Effluent from Sludge Wilden Pump	Drain
V-93	2 in BALL	M	Sludge Pump Suction	Sludge Pump Suction Isolation
V-94	3 in BALL	M	West End of T900B System	Drain for T900B
V-95	2 in BALL	M	Influent to TK-1	Influent Isolation
V-96	2 in GATE	M	Influent to TK-1	Flow Adjust to TK-1
V-97	1/2 in BALL	M	Influent Air to Filter Press	Blow Down Filter Press
V-98	2 in BALL	M	TK-11 Filtrate Recirculation to TK-8	Recirculation from TK-11 to TK-8
V-99	2 in BALL	M	Effluent from TK-11	Recirculate TK-11
V-100	3 in GATE	M	Membrane Discharge	Control Flow to TK-11
V-101	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-102	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-103	3/4 in BALL	M	Influent to TK-12	TK-12 Flush Line
V-200	2 in BALL	M	Influent Line to GAC Adsorbers	Processed Water into GAC
V-201	2 in BALL	M	Effluent from EQ** Tank	Influent to TK-1
V-202	3 in BALL	M	Effluent Line to EQ** Tank (not in use)	Influent to Pump or Sock Filters
V-203	2 in BALL	M	Influent Line to GAC Adsorbers	Recirculation to EQ** Tank
V-204	2 in BALL	M	Influent Line to GAC Adsorbers	Recirculation to EQ** Tank
V-205	PRESSURE RELIEF	M	Influent Line to GAC Adsorbers	GAC Pressure Adjustment
V-206	3 in BALL	M	Treated Effluent Line before GAC A	Treated Effluent Discharge

** = Equalization

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-207	3 in BALL	M	Return Line to EQ** Tank before GAC A	Effluent Return to EQ** Tank
V-208	3 in BALL	M	Treated Effluent Line before GAC A	Influent to GAC A
V-209	3 in BALL	M	Return Line to EQ** Tank before GAC A	Backwash Return to EQ** Tank
V-210	3 in BALL	M	Middle Line GAC Piping	Isolation Valve
V-211	3 in BALL	M	Treated Effluent Line between GAC A and B	Effluent from GAC A
V-212	3 in BALL	M	Return to EQ** TK between GAC A and B	Backwash or Rupture Disk Return to EQ**
V-213	3 in BALL	M	Treated Effluent Line between GAC A and B	Influent to GAC B
V-214	3 in BALL	M	Return to EQ** TK between GAC A and B	Backwash Return to EQ** Tank
V-215	3 in BALL	M	Treated Effluent Line in front of GAC B	Treated Effluent Discharge
V-216	3 in BALL	M	Return to EQ** TK in front of GAC B	Backwash or Rupture Disk Return to EQ**
V-217	3 in BALL	M	Treated Effluent Line between GAC B and C	Effluent from GAC B
V-218	3 in BALL	M	Return to EQ** TK between GAC B and C	Backwash or Rupture Disk Return to EQ**
V-219	3 in BALL	M	Treated Effluent Line between GAC B and C	Influent to GAC C
V-220	3 in BALL	M	Return to EQ** TK between GAC B and C	Backwash or Rupture Disk Return to EQ**
V-221	3 in BALL	M	Treated Effluent Line in from of GAC C	Treated Effluent Discharge
V-222	3 in BALL	M	Return to EQ** TK in front of GAC C	Backwash or Rupture Disk Return to EQ**

** = Equalization

APPENDIX 1
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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-223	3 in BALL	M	Treated Effluent Line between GAC C and D	Effluent from GAC C
V-224	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash or Rupture Disk Return to EQ**
V-225	3 in BALL	M	Treated Effluent Line between GAC C and D	Influent to GAC D
V-226	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash Return to EQ** Tank
V-227	3 in BALL	M	Treated Effluent Line in front of GAC D	Treated Effluent Discharge
V-228	3 in BALL	M	Return to EQ** TK in front of GAC D	Backwash or Rupture Disk Return to EQ**
V-229	3 in BALL	M	Treated Effluent Line after GAC D	Effluent from GAC D
V-230	3 in BALL	M	Return Line to EQ** Tank after GAC D	Effluent Return to EQ** Tank
V-231	3 in BALL	M	Treated Effluent Line after GAC D	Final Effluent Discharge
V-232	3 in BALL	M	Return Line to EQ** Tank after GAC D	Final Effluent Return to EQ** Tank

** = Equalization